

REMARKS

The Examiner objected to the drawings for various problems. The Examiner objected to the content of the Abstract. The Examiner objected to Claim 21 for being identical to Claim 16. The Examiner objected to the Specification under 35 U.S.C. § 112, first paragraph.

The Examiner rejected Claims 7, 8, 22-27, 29-31, 33, and 34 under 35 U.S.C. § 112, first paragraph as being not enabled by the Specification. The Examiner rejected Claims 10 and 32 under 35 U.S.C. § 112, first paragraph as being not enabled by the Specification. The Examiner rejected Claim 29 under 35 U.S.C. § 112, first paragraph as being not enabled by the Specification.

The Examiner rejected Claims 4 and 34 under 35 U.S.C. § 112, second paragraph as being indefinite. The Examiner rejected Claims 5, 14, and 30 under 35 U.S.C. § 112, second paragraph as being incomplete. The Examiner rejected Claim 20 under 35 U.S.C. § 112, second paragraph as being incomplete.

The Examiner rejected Claims 1-5, 7-11, 13-15, 17-20, 22-28, and 32-34 under 35 U.S.C. § 102(b) as being anticipated by Patent Number 6,586,747 (Erdman). The Examiner rejected Claims 1-5, 7-15, 17-20, 22-28, and 32-34 under 35 U.S.C. § 102(a) as being anticipated by Admitted Prior Art. The Examiner rejected Claims 1-4, 6-13, 15-29, and 31-34 under 35 U.S.C. § 102(b) as being anticipated by the Satyamurthy article.

The Examiner rejected Claims 6, 16, 21, 29, and 30 under 35 U.S.C. § 103(a) as being unpatentable over Erdman in view of Satyamurthy. The Examiner rejected Claims 6, 16, 21, and 29-31 under 35 U.S.C. § 103(a) as being unpatentable over Admitted Prior Art in view of Satyamurthy.

Such objections and rejections are noted.

Claims 1-5, 13, 29, and 34 have been amended, Claims 15 and 21 have been cancelled, and Claims 35 and 36 have been added. Applicant respectfully submits that Claims 1-14, 16-20, and 22-36 are allowable. Filed herewith is a 37 C.F.R. § 1.132 Declaration of Charles W. Alvord, a person of skill in the art of target

assemblies. The Declaration sets forth facts regarding the art cited by the Examiner and the state of the tomography art at the time of filing of the Application. Applicant respectfully submits that Claims 1 to 14, 16 to 20, and 22 to 36 are allowable.

Drawings

With respect to the drawings, the Examiner states:

2. The drawings are objected to under 37 CFR 1.83(a) because they fail to show;
 - a. inlet port 220,
 - b. outlet port 222,
 - c. how inlet port 220 and outlet port 222 are connected to the target chamber 104' in order to function as described in the specification paragraph [0028]. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d).
3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 306 and 308. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFW 1.121 (b) are required in reply to the Office action to avoid abandonment of the application.
4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because;
 - A. reference character "104" has been used to designate both a target chamber and a cooling channel (see Fig. I and specification paragraphs [0009] and [0010],
 - B. reference characters "102", "104" and "306" have both been used to designate what appears to be the same coolant channel.

Paper Number 20050411, Application Serial No. 10/671,086, at 2-3.

With respect to inlet port **220**, outlet port **222**, and their connection to target chamber **104'**, Applicants respectfully submit that the Examiner has misconstrued the drawings. The inlet port **220** and the outlet port **222** appear on FIGS. 2 and 3, which illustrate the prior art target assembly **110**. The figures clearly illustrate the inlet port **220** and the outlet port **222** providing fluid connection to the prior art target chamber **104**.

FIGS. 4-6 illustrate one embodiment of the invention. FIG. 5 is an offset cross-sectional view of one embodiment of the target assembly **10** of the present invention. Applicants draw the Examiner's attention to the inlet port **220** and the outlet port **222** illustrated in FIGS. 2 and 3, which show the ports **220**, **222** having a longitudinal axis along the center of the prior art target assembly **110**. Because of the position of these ports **220**, **222** in the body of the target assembly **110**, **10**, they are not visible in the cross-sectional view illustrated in FIG. 5. Further, because the ports **220**, **222** are known in the art and are illustrated in FIGS. 2 and 3, it is not necessary to illustrate them further to understand the invention. See 35 U.S.C. § 113 ("The applicant shall furnish a drawing where necessary for the understanding of the subject matter sought to be patented.") One skilled in the art at the time this application was filed would find the drawings to sufficiently disclose the features of the invention claimed. Further, any characterization by the Examiner that the inlet and outlet ports **220**, **222** are essential to the invention are not supported by any statements in Applicants' Specification. See MPEP 2172.01.

With respect to the Examiner's observation that item numbers **306**, **308** shown in the figures are not discussed in the Specification, Applicants have amended paragraph 9 to describe the fins **306**, **308** shown on FIG. 3. Applicants respectfully submit that no new matter has been added to the specification by this amendment, particularly in view that FIG. 3 depicts the prior art and the description of the fins **306**, **308** pertains to characteristics of the prior art target assemblies **110**.

With respect to the Examiner's observation that item number **104** is used to refer to two components, the target chamber and a cooling channel, Applicants have amended paragraph 9 to identify the target chamber **104** and the cooling channel **102'**. FIG. 1 has also been amended to change item **104** to item **102'**. Applicants respectfully submit that no new matter has been added to the specification by this amendment, particularly in view that FIG. 1 depicts the prior art and the description of the target chamber **104** and the cooling channel **102'** pertains to characteristics of the prior art target assemblies **110**.

With respect to the Examiner's observation that item numbers **102**, **104**, and **306** apparently depict the same coolant channel, Applicants have amended paragraph

9 to describe the relationship of fins **306, 308** shown on FIG. 3. Further, as stated above, Applicants have changed the item numbers and amended their description in paragraph 9. Applicants respectfully submit that no new matter has been added to the specification by this amendment, particularly in view that FIG. 3 depicts the prior art and the description of the fins **306, 308** pertains to characteristics of the prior art target assemblies **110**.

Specification - Abstract

With respect to the Specification, the Examiner objects to the Abstract for not being clear and for using comparisons with the prior art. With respect to the Abstract, the Examiner states:

The abstract of the disclosure is objected to because:

A. Of the relative and/or contradictive terms used throughout, for example, minimal conduction paths yet increased cooling capacity, superior oxidation resistance, high beam currents (as compared to what?) high Reynolds number flow (compared to what, is 100, 1,000 or 10,000 considered high or is this flow being compared to prior art?), etc.

B. It is unclear whether the internal cooling channels have minimal conduction paths and high Reynolds number flows or the target assembly has minimal conduction paths and high Reynolds number flows

Paper Number 20050411, Application Serial No. 10/671,086, at 4-5.

The zealousness of the Examiner is admired. However, Applicants point out that there is no statutory requirement for an Abstract, although the Rules require an abstract. Section 1.72 of the Patent Rules states: "The purpose of the abstract is to enable the United States Patent and Trademark Office and the public generally to determine quickly from a cursory inspection the nature and gist of the technical disclosure." 37 U.S.C. § 1.72(b). The PTO has guidelines for examination relating to the contents of the abstract, however, these are guidelines and, as such, are not enforceable as a matter of law.

The Examiner objects to the phrase "superior oxidation resistance." A search of the United States Patent and Trademark Office Patent Database maintained at www.uspto.gov shows that three issued patents use that exact same phrase in their abstract. Additionally, a search shows that 11,390 patents have issued since 1976

that have used the term "superior" in the abstract. The Examiner objects to the phrase "increased cooling capacity," which was found to be contained in the abstract of six issued patents. The Examiner objects to the phrase "high Reynolds number," although a search of the PTO database located two issued patents using that exact phrase. Accordingly, Applicants fail to see how the Examiner can object to language that appears in issued patents, unless, of course, the Examiner is claiming that the PTO issues patents that are not in accordance with the requirements of the patent laws.

However, for the sake of expediency and recognizing that argument over an abstract that is easily modified is a waste of resources, Applicants have amended the Abstract to comply with the wishes of the Examiner.

Claim Objections

The Examiner objected to Claim 21 for being identical to Claim 16. Applicants have cancelled Claim 21 to correct this apparent typographical error in repeating a claim.

Objection Under 35 U.S.C. § 112, first paragraph

The Examiner objected to the specification under 35 U.S.C. § 112, first paragraph. The Examiner states:

8. The specification is objected to under 35 U.S.C 112, first paragraph, as failing to provide an adequate written description of the invention and as failing to adequately teach how to make and/or use the invention, i.e. failing to provide and [sic] enabling disclosure.

A. Paragraph [0027] states that it is the high Reynolds number indicating turbulent flow that compensates for the low thermal conductivity of the tantalum target assembly, but paragraph [0029] contradicts this by stating it is the developed flow of the cooling water that allows for greater heat transfer, therefore the specification is insufficient and non enabling in disclosing how and in what manner the lower thermal conductivity is accounted for.

B. Paragraph [0031] states that the function of inducing fluid flow within the target chamber is accomplished by the shape of the target chamber and in another embodiment it is the size of the front window. The specification is insufficient in disclosing how and in what manner either of these will actually induce said flow.

C. The specification is insufficient in disclosing the meets and bounds of the terms "developed flow", "nearly developed flow", "fully developed flow" and "turbulent flow"

Paper Number 20050411, Application Serial No. 10/671,086, at 5-6.

Initially, Applicants point out that the Examiner is objecting, in part, to the description of the theory of operation of the present invention. The Examiner is reminded that the theory behind the invention is not a requirement for 35 U.S.C. § 112, first paragraph. "[I]t is **not** a requirement of patentability that an inventor correctly set forth, or even know, how or why the invention works." *In re Cortright*, 165 F.3d 1353, 49 U.S.P.Q.2d 1464 (Fed. Cir. 1999) (emphasis added); *see, also, Newman v. Quigg*, 877 F.2d 1575, 1581, 11 USPQ2d 1340, 1345 (Fed. Cir. 1989).

Filed herewith is a 37 C.F.R. § 1.132 Declaration of Charles W. Alvord, a person of skill in the art of target assemblies. The facts set forth in the Declaration establish that the Examiner's statements with respect to the specification are incorrect:

A reading of Application Serial Number 10/671,086, along with the knowledge one skilled in the art would have, provides sufficient information for one skilled in the art to understand the discussion contained in Paragraph 27 relating to the flow of the cooling water through the channels **502, 504, 506, 508**. *See* Declaration, para. 11.

A reading of Application Serial Number 10/671,086, in particular paragraphs 28 and 31, along with the knowledge one skilled in the art would have, provides sufficient information for one skilled in the art to understand the functions enumerated in paragraph 31. *See* Declaration, para. 12.

A person skilled in the art for the subject matter of Application Serial Number 10/671,086 would, as a minimum, be familiar with terms and concepts of "developed flow", "nearly developed flow", "fully developed flow" and "turbulent flow" and would not need further explanation of such basic concepts. *See* Declaration, para. 13.

Further, the Examiner is reminded that "[t]here is a strong presumption that an adequate written description of the claimed invention is present when the application is filed." MPEP 2163.A, at 2100-166. Also, the MPEP states: "The examiner has the initial burden, after a thorough reading and evaluation of the content of the application, of presenting evidence or reasons why a person skilled in the art would not recognize that the written description of the invention provides support for the claims." MPEP 2163.B, at 2100-168. Other than bald assertions that the

specification is insufficient, the Examiner has not provided "evidence or reasons why a person skilled in the art would not recognize that the written description of the invention provides support for the claims."

Because Applicants have provided evidence that the disclosure is enabled and the Examiner has not offered any reason, other than his opinion, as to why the written description or enablement is lacking, Applicants request that the Examiner withdraw his objection to the specification under 35 U.S.C. § 112, first paragraph.

Rejection Under 35 U.S.C. § 112, first paragraph

The first paragraph of 35 U.S.C. § 112 states "The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention." 35 U.S.C. § 112, first para.

Section 2164 of the MPEP discusses the enablement requirement of 35 U.S.C. § 112, first paragraph. In particular, MPEP section 2164.01(b) states: "As long as the specification discloses at least one method for making and using the claimed invention that bears a reasonable correlation to the entire scope of the claim, then the enablement requirement of 35 U.S.C. 112 is satisfied." MPEP, at 2100-186 (Rev. 2, May 2004). Further, MPEP section 2164.01(c) states: "If a statement of utility in the specification contains within it a connotation of how to use, and/or the art recognizes that standard modes of administration are known and contemplated, 35 U.S.C. 112 is satisfied." *Id.*

Accordingly, the Examiner must, if the MPEP is to be followed, find enablement if the application includes a disclosure of "at least one method for making and using the claimed invention that bears a reasonable correlation to the entire scope of the claim" and if the application discloses a statement of utility that contains "a connotation of how to use, and/or the art recognizes that standard modes of administration are known and contemplated." Applicants respectfully submit that the Application does make such disclosure or the art recognizes such standard modes, as described more fully below.

Claims 7, 8, 22-27, 29-31, 33, and 34

The Examiner rejected Claims 7, 8, 22-27, 29-31, 33, and 34 under 35 U.S.C. § 112, first paragraph. The Examiner states:

11. Claims 7, 8, 22-27, 29-31, 33 and 34 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The definitions, meets and bounds of the term developed flow and what Reynolds number indicates a turbulent flow, critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. *See In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). Clearly the rate of transfer of heat depends upon such limitations and applicant's alleged invention will not operate as claimed without such.

Paper Number 20050411, Application Serial No. 10/671,086, at 6-7.

Filed herewith is a 37 C.F.R. § 1.132 Declaration of Charles W. Alvord, a person of skill in the art of target assemblies. The facts set forth in the Declaration establish that the Examiner's statement with respect to Claims 7, 8, 22-27, 29-31, 33, and 34 is incorrect:

A reading of Application Serial Number 10/671,086, along with the knowledge one skilled in the art would have, provides sufficient information for one of ordinary skill in the art to understand developed flow and what Reynolds number indicates a turbulent flow. Decl. para. 16.

The Declaration states facts regarding the level of skill possessed by someone of ordinary skill in the art of target assemblies. Applicants remind the Examiner that the enablement requirement must be examined with the skills and knowledge possessed by one skilled in the art to which the invention pertains. The facts stated in the Declaration rebut the statement of the Examiner that the disclosure is not enabling.

The Examiner makes the sweeping statement: "Clearly the rate of transfer of heat depends upon such limitations and applicant's alleged invention will not operate as claimed without such." The Declaration offers evidence to rebut such a broad assertion by the Examiner.

Applicants respectfully submit that the claims include limitations to the level of detail necessary to enable the invention and that the specification, in combination with the knowledge and skills of one skilled in the art, is sufficient for one skilled in the art to make and use the invention without undue experimentation. Accordingly,

because Applicants have provided evidence that the disclosure is enabled, Applicants respectfully request that the Examiner withdraw his rejection of Claims 7, 8, 22-27, 29-31, 33, and 34 under 35 U.S.C. § 112, first paragraph.

Claims 10 and 32

The Examiner rejected Claims 10 and 32 under 35 U.S.C. § 112, first paragraph. The Examiner states:

12. Claims 10 and 32 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for irradiation by a proton particle beam, does not reasonably provide enablement for irradiation by any other type of particle beam. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. The limitations "irradiation" and "bombarded with a particle beam" includes the use of other types of particles other than protons. The disclosure fails to define exactly what or which "particles" applicant's invention is capable of use with. Would the target still function if for example it was bombarded or irradiated with a beam of gamma, Helium, neutron or electron particles?

Paper Number 20050411, Application Serial No. 10/671,086, at 7.

Filed herewith is a 37 C.F.R. § 1.132 Declaration of Charles W. Alvord, a person of skill in the art of target assemblies. The facts set forth in the Declaration establish that the Examiner's statement with respect to Claims 10 and 32 is incorrect:

A reading of Application Serial Number 10/671,086, along with the knowledge one skilled in the art would have, provides sufficient information for one of ordinary skill in the art to make and use the target assembly as described in Claims 10 and 32 without undue experimentation. Decl. para. 20.

The Examiner is complaining that the specification does not enable the environment in which the claimed invention is used. As stated above, the enablement requirement is satisfied if the disclosure enables one skilled in the art to make and use the invention as claimed without undue experimentation. The Declaration states facts regarding the level of skill possessed by someone of ordinary skill in the art of target assemblies for producing fluorine-18. Applicants remind the Examiner that the enablement requirement must be examined with the skills and knowledge possessed by one skilled in the art to which the invention pertains. In this case, the art relates to target assemblies for the production of fluorine-18.

The Examiner is referred to MPEP section 2164 for a discussion of the enablement requirement of 35 U.S.C. § 112, first paragraph. In particular, the Examiner is referred to MPEP section 2164.01(b) which states: "As long as the specification discloses at least one method for making and using the claimed invention that bears a reasonable correlation to the entire scope of the claim, then the enablement requirement of 35 U.S.C. 112 is satisfied." MPEP, at 2100-186 (Rev. 2, May 2004). Further, the Examiner is referred to MPEP section 2164.01(c) which states: "If a statement of utility in the specification contains within it a connotation of how to use, and/or the art recognizes that standard modes of administration are known and contemplated, 35 U.S.C. 112 is satisfied." *Id.* Applicants respectfully submit that the Specification makes the disclosures suggested by the MPEP to satisfy the 35 U.S.C. § 112, first paragraph, requirement for an enabling disclosure with respect to making and using the claimed invention. In particular, the Examiner is referred to Specification paragraphs 23 to 37.

With respect to Claim 32, Applicants point out that the claim includes means-plus-function limitations as permitted by 35 U.S.C. § 112, paragraph six. Accordingly, the claim limitation of "a means for containing a target liquid for irradiation" must be interpreted in accordance with the specification. The Examiner "must apply 35 U.S.C. 112, sixth paragraph in appropriate cases, and give claims their broadest reasonable interpretation, **in light of and consistent with the written description of the invention in the application.**" MPEP 2181, sub-section I, pg. 2100-220, 8th ed., rev. 2 (emphasis added). Because the specification describes the structures and environment of the invention, one skilled in the art would recognize the type of irradiation that the target liquid would be exposed to.

Because Applicants have provided evidence that the disclosure is enabled and the Examiner has not offered any reason, other than his opinion, as to why enablement is lacking, Applicants request that the Examiner withdraw his rejection of Claims 10 and 32 under 35 U.S.C. § 112, first paragraph.

Claim 29

The Examiner rejected Claim 29 under 35 U.S.C. § 112, first paragraph. The Examiner states:

13. Claim 29 is rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The required size of the cooling channel, critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. *See In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). The disclosure fails to disclose the basis for, how and in what manner the cooling channels are sized in order to sustain or even develop a developed flow within. It is questioned how and in what manner the applicant has determined the type of flow (laminar, turbulent, etc.) within ANY of the cooling channels.

Paper Number 20050411, Application Serial No. 10/671,086, at 7.

Filed herewith is a 37 C.F.R. § 1.132 Declaration of Charles W. Alvord, a person of skill in the art of target assemblies. The facts set forth in the Declaration establish that the Examiner's statement with respect to Claim 29 is incorrect because "one skilled in the art has the ability to perform basic fluid dynamic calculations to determine the type of flow within a conduit such as the cooling channels." Decl. para. 22.

Because Applicants have provided evidence that the disclosure is enabled and the Examiner has not offered any reason, other than his opinion, as to why enablement is lacking, Applicants request that the Examiner withdraw his rejection of Claim 29 under 35 U.S.C. § 112, first paragraph.

Rejection Under 35 U.S.C. § 112, second paragraph

Claims 4 and 34

The Examiner rejected Claims 4 and 34 under 35 U.S.C. § 112, second paragraph. The Examiner states:

14. Claims 4 and 34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A. Claim 4 recites the limitation "a third channel" in the first and second line.

There is insufficient antecedent basis for this limitation, as no second channel exists in either claim 4 or claim 1 from which it depends.

B. Claim 34 recites the limitation "said first cooling channel" in the first line.

There is insufficient antecedent basis for this limitation in the claim.

Paper Number 20050411, Application Serial No. 10/671,086, at 8.

Applicants thank the Examiner for pointing out these typographical errors. Claim 4 has been amended to change "third" channel to "second" channel. Also, Claim 34 has been amended to delete the reference to "said first cooling channel" and to reflect that the limitation added by the claim is a limitation related to the "means for cooling" element of Claim 32. Applicants respectfully submit that the amended claims are in compliance with 35 U.S.C. § 112, second paragraph and respectfully request that the Examiner withdraw his rejection of the claims.

Claims 8, 25-27, and 34

The Examiner rejected Claims 8, 25-27, and 34 for being indefinite. The Examiner has not cited a statutory basis for such a rejection, although it is assumed to be 35 U.S.C. § 112, second paragraph. The Examiner states:

15. The phrase "Reynolds number indicating a turbulent flow" in Claims 8, 25-27 and 34 is a relative term which renders the claims indefinite. The phrase "Reynolds number indicating a turbulent flow " is not defined by the claims, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The requisite degree of how or what numbers would satisfy said claims is unascertainable.

Paper Number 20050411, Application Serial No. 10/671,086, at 8.

Filed herewith is a 37 C.F.R. § 1.132 Declaration of Charles W. Alvord, a person of skill in the art of target assemblies. The facts set forth in the Declaration establish that the Examiner's statement with respect to Claims 8, 25-27, and 34 is incorrect because 'the statement "Reynolds number indicating a turbulent flow " is a very precise statement to one skilled in the art and readily conveys to one skilled in the art the information necessary to apply the limitation.' Decl. para. 26.

Because Applicants have provided evidence that the phrase "Reynolds number indicating a turbulent flow" is precise and not indefinite and because the Examiner has not offered any reason, other than his opinion, as to why the claims are indefinite, Applicants request that the Examiner withdraw his rejection of Claims 8, 25-27, and 34 under 35 U.S.C. § 112, second paragraph.

Claims 5, 14, and 30

The Examiner rejected Claims 5, 14, and 30 under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to Claims 5, 14, and 30, the Examiner states:

16. Claims 5, 14 and 30 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: the manner in which the cooling channels are connected in order for coolant to flow through the target body, for example the claims fail to disclose if the third and fourth cooling channels are connected to each other, if the third and fourth channels are separate and independent of the first and second channels, etc., etc., etc.

Paper Number 20050411, Application Serial No. 10/671,086, at 8.

Section 2172.01 of the MPEP states that "a claim which fails to interrelate essential elements of the invention as defined by applicant(s) in the specification may be rejected under 35 U.S.C. 112, second paragraph, for failure to point out and distinctly claim the invention." MPEP 2172.01, at 2100-204. That section states "Such essential matter may include missing elements, steps or necessary structural cooperative relationships of elements described by the applicant(s) as necessary to practice the invention." *Id.*

Applicants caution the Examiner to not import limitations from the specification into the claims by assuming certain disclosed configurations and features of the disclosed embodiments are essential. Applicants have not disclosed the interconnection of the cooling channels **504**, **506** as being essential. In the embodiment illustrated in the Application, the first cooling channel **504** and the second cooling channel **506** are connected such that fluid in one channel flows through the other channel. However, each channel **504**, **506** can be independently supplied with cooling water and the apparatus will still perform as described. Further, the manner of introducing coolant to the various cooling channels is well within the skills and knowledge of one skilled in the art. Therefore, a limitation requiring the

connection of the first and second cooling channels and the connection of the third and fourth cooling channels is not necessary nor required in the specified claims.

The Examiner asserts that "the claims fail to disclose . . . if the third and fourth channels are separate and independent of the first and second channels." Applicants direct the Examiner's attention to the language as used in Claim 5, which states "a third cooling channel substantially parallel to said first cooling channel" and "a fourth cooling channel substantially parallel to said second cooling channel." The spatial relationship of the third to the first and the second to the fourth cooling channel is plainly stated in the claim. Applicants respectfully submit that there is no requirement to claim more.

Accordingly, Applicants respectfully request that the Examiner withdraw his rejection of Claims 5, 14, and 30 under 35 U.S.C. § 112, second paragraph, because Applicants have not omitted to interrelate essential elements of the invention as asserted by the Examiner.

Claim 20

With respect to Claim 20, the Examiner states:

17. Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are:

- A. The manner of shaping a target chamber such that a steam jet is formed in the manner proposed,
- B. the manner of shaping a target chamber such that a steam jet flows into a steam bubble in the manner proposed,
- C. the manner in which the first cooling channel transfers heat directly from the steam bubble thereby condensing said bubble when the first cooling channel is isolated from the target chamber and therefore said steam bubble.

Paper Number 20050411, Application Serial No. 10/671,086, at 9.

Applicants are confused. The Examiner has rejected Claim 20 on the grounds of "omitting essential structural cooperative relationships of elements." However, the

Examiner then states that the missing structural cooperative relationships are structural limitations and does not identify any missing cooperative relationship between elements. Applicants can only assume that the Examiner meant that the grounds of rejection are for omitting "matter disclosed to be essential to the invention as described in the specification." MPEP 2172.01. But, as pointed out earlier, such a rejection requires that the missing element be described by the applicant as necessary to practice the invention. Applicants have not described any of the limitations of Claim 20, as identified by the Examiner, as being essential to the invention.

With respect to the Examiners third relationship, C, the plain language of the whole claim, including the limitations of the independent claim, indicates that first cooling channel is isolated from the volume or contents of the target chamber. This is supported by the Claim 13 limitation that the first cooling channel is "for removing heat contained in said target chamber" which indicates that heat transfer occurs between the first cooling channel and the target chamber. Further, Applicants point out that Claim 20 does not use the word directly as recited by the Examiner. Accordingly, the Examiner's grounds for rejection do not make technical sense because heat transfer is understood by one skilled in the art. Such an understanding aids one skilled in the art to remove the heat generated by the process in which the target assembly is used. Considering the claim as a whole, the only reasonable interpretation of the term "isolated" is isolation of the volumes of the cooling channel and the target chamber. However, Applicants have amended Claim 13 to add "from said volume within," which makes explicit that which was implied in the claim.

Filed herewith is a 37 C.F.R. § 1.132 Declaration of Charles W. Alvord, a person of skill in the art of target assemblies. The facts set forth in the Declaration establish that the Examiner's statement with respect to Claim 20 is incorrect because "a reading of Application Serial Number 10/671,086, along with the knowledge and skill one skilled in the art would have, provides sufficient information for one of ordinary skill in the art to understand, make, and use the invention as claimed in Claim 20." Decl. para. 29.

Accordingly, Applicants respectfully request the Examiner withdraw his rejection of Claim 20 for the above reasons. If the Examiner is still under the belief

that Claim 20 is not allowable, Applicants request that the Examiner clearly describe the reasons for such a rejection.

Anticipation Under 35 U.S.C. § 102

Section 2131 of the Manual of Patent Examining Procedure describes the basis for anticipation under 35 U.S.C. § 102. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim. *In re Bond*, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990).

The Examiner rejected the claims as being anticipated under several grounds:

Claims 1-5, 7-11, 13-15, 17-20, 22-28, and 32-34 were rejected under 35 U.S.C. § 102(b) as being anticipated by Patent Number 6,586,747 (Erdman);

Claims 1-5, 7-15, 17-20, 22-28, and 32-34 were rejected under 35 U.S.C. § 102(a) as being anticipated by Admitted Prior Art;

Claims 1-4, 6-13, 15-29, and 31-34 were rejected under 35 U.S.C. § 102(b) as being anticipated by the Satyamurthy article;

Paper Number 20050411, Application Serial No. 10/671,086.

Obviousness Under 35 U.S.C. § 103

A rejection under 35 U.S.C. § 103(a) must be supported by a *prima facie* case of obviousness. MPEP § 2142. "The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness." MPEP § 2142, pg. 2100-121.

The first element in establishing a *prima facie* case of obviousness is that "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings." MPEP § 2143. The second element is that there

must be a reasonable expectation of success. *Id.* The third element is that "the prior art reference (or references when combined) must teach or suggest all the claim limitations." *Id.* "There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art." *In re Rouffet*, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d 1453, 1457-58 (Fed. Cir. 1998) (The combination of the references taught every element of the claimed invention, however without a motivation to combine, a rejection based on a *prima facie* case of obvious was held improper); see MPEP § 2143.01.

The Examiner rejected the claims as being obvious under several grounds:

Claims 6, 16, 21, 29, and 30 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Erdman in view of Satyamurthy; and

Claims 6, 16, 21, and 29-31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Admitted Prior Art in view of Satyamurthy.

Paper Number 20050411, Application Serial No. 10/671,086.

The Erdman Patent

Erdman discloses a liquid-target holding assembly **12** having a cooling block **68** mounted to the holder body **56**, which is part of the liquid-target holder **52**. Erdman, FIGS. 1 & 3. "The holder body **56** includes a target cavity **60** formed therein." Erdman, Col. 5, lines 23-24. "The target cavity **60** is enclosed on its front side by a thin front window **62** removably mounted to the holder body's mounting surface **58**." Erdman, Col. 5, lines 29-31. "The liquid-target holder **52** also includes a rear window **64** defining the distal or rear portion of the target cavity **60**." Erdman, Col. 5, lines 51-53.

The target cavity **60** has "the front and rear windows **62** and **64** [that] are spaced apart by a first distance, such as 3 mm, to define the depth of the target cavity **60**," and the "holder body **56** and target cavity **60** are oriented such that a longitudinal axis **70** of the target cavity **60** is at an acute angle relative to the beam axis **18**." Erdman, Col. 6, lines 34-42.

The cooling block **68** has a support portion **70** that "extends into the receiving aperture **66** in the holder body" **56**. Erdman, Col. 7, lines 18-20. "The support portion **70** includes a plurality of elongated parallel support ribs **72** spaced apart from each other. The support ribs **72** are positioned to engage the rear window **64** and provide additional support to the back of the rear window so as to resist the pressures generated within the target cavity **60** during the irradiation process." Erdman, Col. 7, lines 23-30. "The support ribs **72** are spaced apart from each other so as to form at least one cooling channel **74** adjacent to the thin rear window **64**." Erdman, Col. 7, lines 33-35.

Admitted Prior Art

Applicants' specification contains a full discussion, including figures, of the admitted prior art. However, it bears noting that one distinction between the prior art disclosed in the Application and the Applicants' invention is that the prior art has cooling channels external to the target body whereas the Applicants' invention has cooling channels enclosed within the target body. Another distinction between the prior art and Applicants' invention is that the prior art cooling channels **302**, **304**, **204** have complex flow paths that do not readily support the claimed types of flow. Rather, the prior art device **110** relies upon a large quantity of cool water to perform the cooling function.

Satyamurthy

The Satyamurthy article discloses a water target for the production of the fluoride-18 ion. The target assembly includes a target chamber and a cooling water chamber located directly behind the target chamber. See Satyamurthy, Fig. 1. The cooling system has an inlet and a coaxial outlet. *Id.* The inlet and the outlet function to carry the cooling water and do not function directly to remove heat from the target chamber. "The heat generated during the irradiation is dissipated from the back of the target by recirculating chilled water (12°C)." Satymurthy, at 67. As is apparent from Figure 1 and the associated description of the water target in Satymurthy, the cooling system of the water target differs substantially from that disclosed in FIGS. 4 to 6 of the Application.

Independent Claim 1

The Examiner rejected Claim 1 as being anticipated by Erdman, the Admitted Prior Art, and the Satyamurthy article. Applicants have amended Claim 1 to add several limitations. No new matter has been added through these limitations. The target body element has been further defined to provide an antecedent basis to support other limitations.

The target chamber element includes a limitation that the "upper wall [is] substantially perpendicular to said front face" of the target body. This added limitation provides an antecedent basis to support other limitations.

The Examiner apparently interprets the phrase "a selected distance from" as meaning that the first cooling channel has some point that is a distance from the upper wall. Such an interpretation gives no meaning to the phrase because any two elements or devices will have some distance between them at some point. The interpretation intended and the interpretation consistent with the specification is that the selected distance is a distance between any point on the first cooling channel and a corresponding adjacent point on the upper wall. To more clearly define the spatial relationship of the elements, Applicants have replaced the phrase "a selected distance from" with the phrase "running alongside a portion of." Applicants respectfully submit that the two phrases are equivalent and the scope of the claim is not changed by such substitution.

The first cooling channel element includes the limitation that the channel is "running alongside a portion of said upper wall," which clearly distinguishes the invention from Satymurthy, which does not disclose a structure corresponding to an upper wall, let alone disclose a cooling channel running alongside the upper wall, as defined by the claim. Further, this claim limitation distinguishes the invention from the device disclosed in Erdman, which does not disclose a cooling channel running alongside an upper wall of the target chamber. The cooling channel **74** of Erdman runs along the back wall **64**, which is not perpendicular to the front face of the liquid-target holder **52** and does not correspond to the upper wall in the claim.

The first cooling channel element also includes a limitation for the "first cooling channel being a conduit defined within said target body." This limitation requires that

the first cooling channel be an internal channel, not an external channel as disclosed in the Admitted Prior Art.

Lastly, Claim 1 has been amended to correct a typographical error by referring to "said first cooling channel."

Applicants respectfully submit that the amendment to Claim 1 distinguishes the claimed invention from the prior art and corrects any technical deficiencies in the claim language. Accordingly, Applicants respectfully request the Examiner withdraw the rejection to Claim 1.

Dependent Claim 2

The Examiner rejected Claim 2 as being anticipated by Erdman, the Admitted Prior Art, and the Satyamurthy article. Notwithstanding that Claim 2 is allowable for depending from an allowable base claim, Applicants respectfully submit that Claim 2 is allowable in its own right.

Claim 2 has been amended such that the second cooling channel element includes the limitation that the channel is "running alongside a portion of a back wall," which clearly distinguishes the invention from Satymurthy, which does not disclose a cooling channel running alongside the back wall, as defined by the claim. Satymurthy discloses a reservoir or chamber adjacent the back wall into which cooled water is pumped. The volume of chilled water contained in that reservoir absorbs the heat from the target chamber. The reservoir is structurally different than a channel, which is commonly known by those skilled in the art as a passage or conduit, which interpretation is consistent with the specification.

Further, this claim limitation distinguishes the invention from the device disclosed in Erdman, which does not disclose a cooling channel running alongside two walls of the target chamber. The cooling channel **74** of Erdman runs along the back wall **64**, but Erdman does not disclose a second channel running along another wall of the chamber **60**.

Also, Claim 2 has been amended to include the limitation that the "second cooling channel being a conduit defined within said target body." This limitation

requires that the second cooling channel be an internal channel, not an external channel as disclosed in the Admitted Prior Art.

Applicants respectfully submit that the amendment to Claim 2 distinguishes the claimed invention from the prior art. Accordingly, Applicants respectfully request the Examiner withdraw the rejection to Claim 2.

Dependent Claim 3

The Examiner rejected Claim 3 as being anticipated by Erdman, the Admitted Prior Art, and the Satyamurthy article. Notwithstanding that Claim 3 is allowable for depending from an allowable dependent claim, which depends from an allowable base claim, Applicants respectfully submit that Claim 3 is allowable in its own right.

Claim 3 has been amended to reflect the cooperative association between the first cooling channel and the second cooling channel. Neither the Admitted Prior Art, the Erdman Patent, nor the Satyamurthy article disclose a first cooling channel and a second cooling channel with the limitations of Claims 1 and 2; therefore, any cooperative relationship identified in Claim 3 cannot be found in such prior art. Further, any characterization of the limitations of Claim 3 by the Examiner as being essential to the invention are not supported by any statements in Applicants' Specification. *See* MPEP 2172.01.

Applicants respectfully submit that Claim 3 is not anticipated by the prior art. Accordingly, Applicants respectfully request the Examiner withdraw the rejection to Claim 3.

Dependent Claim 4

The Examiner rejected Claim 4 as being anticipated by Erdman, the Admitted Prior Art, and the Satyamurthy article. Notwithstanding that Claim 4 is allowable for depending from an allowable base claim, Applicants respectfully submit that Claim 4 is allowable in its own right. Claim 4 includes the limitation that another cooling channel is parallel to the first cooling channel. For the reasons stated above with respect to Claim 1, neither the Admitted Prior Art, the Erdman Patent, nor the Satyamurthy article disclose a first cooling channel. Accordingly, it is not possible for the cited prior art to include a second channel parallel to the first.

In particular, it is noted that the Examiner rejected the claim for as being anticipated by Satyamurthy because Satyamurthy discloses an inlet coaxial to an outlet. Applicants note that Satyamurthy discloses an inlet and an outlet for carrying cooling fluid. However, Applicants respectfully submit that such inlet and outlet do not meet the limitations of the claims.

Claim 4 has been amended such that the second cooling channel element includes the limitation that the channel is "running alongside a portion of said upper wall," which clearly distinguishes the invention from Satymurthy, which does not disclose an upper wall nor does it disclose a cooling channel running alongside the upper wall, as defined by the claim. Satymurthy discloses a reservoir adjacent the back wall into which cooled water is pumped. The reservoir is structurally different than a channel, which is commonly known by those skilled in the art as a passage or conduit, which interpretation is consistent with the specification. Further, this claim limitation distinguishes the invention from the device disclosed in Erdman, which does not disclose a cooling channel running alongside an upper wall of the target chamber, with the upper wall being perpendicular to the front face of the device that couples to the accelerator. The cooling channels **74** of Erdman run along the back wall **64**, but Erdman does not disclose any cooling channel running alongside another wall of the chamber or cavity **60**.

Claim 4 has been amended to correct a typographical error in referring to the "third" cooling channel when a "second" cooling channel had not been defined in the claims.

Also, Claim 4 has been amended to include the limitation that the "second cooling channel being a conduit defined within said target body." This limitation requires that the second cooling channel be an internal channel, not an external channel as disclosed in the Admitted Prior Art.

Applicants respectfully submit that Claim 4 is not anticipated by the prior art. Accordingly, Applicants respectfully request the Examiner withdraw the rejection to Claim 4.

Dependent Claim 5

The Examiner rejected Claim 5 as being anticipated by Erdman and the Admitted Prior Art. Notwithstanding that Claim 5 is allowable for depending from an allowable base claim, Applicants respectfully submit that Claim 5 is allowable in its own right.

Claim 5 has been amended such that the second, third, and fourth cooling channel elements include the limitation that the channel is "running alongside a portion of" the associated wall, which clearly distinguishes the invention from Erdman, which does not disclose cooling channels running alongside two walls of the target chamber **60**.

Further, Claim 5 has been amended to include the limitation that "said second cooling channel, said third cooling channel, and said fourth cooling channel each being a conduit defined within said target body." This limitation requires that the cooling channels be internal channels, not external channels as disclosed in the Admitted Prior Art.

Applicants respectfully submit that Claim 5 is not anticipated by the prior art. Accordingly, Applicants respectfully request the Examiner withdraw the rejection to Claim 5.

Dependent Claim 6

The Examiner rejected Claim 6 as being anticipated by the Satyamurthy article, and for being obvious over Erdman in view of Satyamurthy and being obvious over the Admitted Prior Art in view of Satyamurthy. Notwithstanding that Claim 6 is allowable for depending from an allowable base claim, Applicants respectfully submit that Claim 6 is allowable in its own right.

In order to support the Examiner's assertion that Claim 6 is obvious, the Examiner must show a *prima facie* case of obviousness. One element of such a showing requires that the prior art include every claimed element and limitation. As stated above with respect to Claim 1, neither Erdman, the Admitted Prior Art, nor the Satyamurthy article disclose all the claimed elements. The Examiner states:

Satyamurthy et al. disclose that there has been more than two decades of ongoing development of cyclotron target bodies for the production of the ^{18}F fluoride ion and discusses the benefits and drawbacks of various materials in the fabrication of said target bodies. Satyamurthy et al. further teaches that the rationale for the choice of tantalum is its relatively low activation by protons and its general chemical inertness and it has a higher thermal conductivity than titanium (another typical target body material)

At the time of applicants invention, it would have been obvious to one of ordinary skill in the art to fabricate the target body of Erdman out of tantalum for the benefits stated within both references as such is nothing more than well known functionally equivalent material.

Paper Number 20050411, Application Serial No. 10/671,086, at 28.

However, the assertion by the Examiner fails to address the low thermal conductivity associated with tantalum. The Satyamurthy article discloses the problem of tantalum having a low thermal conductivity and describes tests conducted at beam currents that generate less heat. See Satyamurthy, at 67-68. The Examiner is referred to the discussion of the Satyamurthy article provided in the Specification at paragraphs 35-37. Without repeating herein the disclosure in the Application, the Application describes the distinctions between the present invention and Satyamurthy. Further, the Specification describes the unexpected results achieved over the device disclosed in Satyamurthy. See Specification, para. 37. Accordingly, Applicants respectfully submit that it is not obvious to use tantalum as a material for the target body in a target assembly with the claimed limitations.

Applicants respectfully submit that Claim 6 is neither anticipated by nor obvious in view of the prior art. Accordingly, Applicants respectfully request the Examiner withdraw the rejection to Claim 6.

Dependent Claims 7 and 8

The Examiner rejected Claims 7 and 8 as being anticipated by Erdman, the Admitted Prior Art, and the Satyamurthy article. Further, the Examiner asserts that these claims include operational limitations. Applicants respectfully disagree. Notwithstanding that Claims 7 and 8 are allowable for depending from an allowable base claim, Applicants respectfully submit that Claims 7 and 8 are allowable in their own right.

Filed herewith is a 37 C.F.R. § 1.132 Declaration of Charles W. Alvord, a person of skill in the art of target assemblies. The facts set forth in the Declaration establish that the Examiner's statement with respect to Claims 7 and 8 is incorrect because "One skilled in the art has the ability to determine the size and configuration of conduits in order to achieve a type of flow." Decl. para. 22. Accordingly, Applicants respectfully submit that the limitations of Claims 7 and 8 define the size and configuration of the first cooling channel and that one skilled in the art would recognize the limitations as structural limitations. Further, neither Erdman, the Admitted Prior Art, nor the Satyamurthy article disclose requiring a specific type of flow associated with their disclosed cooling systems.

Applicants respectfully submit that Claims 7 and 8 are not anticipated by the prior art. Accordingly, Applicants respectfully request the Examiner withdraw the rejection to Claims 7 and 8.

Dependent Claim 9

The Examiner rejected Claim 9 as being anticipated by Erdman, the Admitted Prior Art, and the Satyamurthy article. Applicants respectfully disagree. Notwithstanding that Claim 9 is allowable for depending from an allowable base claim, Applicants respectfully submit that Claim 9 is allowable in its own right.

The target chamber, or cavity, **60** disclosed in the Erdman patent is a cylindrical cavity formed in the holder body **56**. Erdman, Col. 5, lines 23-24; FIG. 3. The rear window **64**, which defines the distal or rear portion of the target cavity **60** is parallel to the front face of the liquid-target holder **52**. Erdman, Col. 5, lines 51-53; FIG. 3. The side wall of the cavity **60** appear to be perpendicular to the rear window **64** and the front face of the liquid-target holder **52**. Erdman, FIG. 3. Because Erdman does not disclose the same structure as the structure defined in Claim 9, Erdman cannot anticipate Claim 9.

The Satyamurthy article discloses a target chamber with a shape distinctly different than that disclosed in the Application. Satyamurthy, Fig. 1. A cursory examination of Figure 1 of Satyamurthy shows that it does not disclose an upper wall as claimed, that is, an upper wall substantially perpendicular to the front face. The upper portion of the chamber disclosed by Satyamurthy is a Reflux Volume that does

not have a surface substantially perpendicular to the front face. Without such an upper wall, it is not possible to have a back wall as claimed. Because Satyamurthy does not disclose the same structure as the structure defined in Claim 9, Satyamurthy cannot anticipate Claim 9.

Applicants respectfully submit that Claim 9 is not anticipated by the prior art. Accordingly, Applicants respectfully request the Examiner withdraw the rejection to Claim 9.

Dependent Claim 10

The Examiner rejected Claim 10 as being anticipated by Erdman, the Admitted Prior Art, and the Satyamurthy article. Applicants respectfully disagree. Notwithstanding that Claim 10 is allowable for depending from an allowable base claim, Applicants respectfully submit that Claim 10 is not anticipated.

Claim 10 includes a structural limitation expressed in functional terms. A search of the USPTO issued patent database for claims that include the phrase "natural circulation" returned many issued patents that define structure by referring to natural circulation. One skilled in the art will recognize that the physical, structural attributes of the target chamber can be defined by specifying characteristics other than dimensions. Further, none of the cited art discloses a device having such characteristics.

Applicants respectfully submit that Claim 10 is not anticipated by the prior art. Accordingly, Applicants respectfully request the Examiner withdraw the rejection to Claim 10.

Dependent Claim 11

The Examiner rejected Claim 11 as being anticipated by Erdman, the Admitted Prior Art, and the Satyamurthy article. Applicants respectfully disagree. Notwithstanding that Claim 11 is allowable for depending from an allowable base claim, Applicants respectfully submit that Claim 11 is allowable in its own right.

Claim 11 includes a means-plus-function limitation, as defined by 35 U.S.C. § 112, sixth paragraph. A means-plus-function limitation must be interpreted to cover

the corresponding structure, materials, or acts in the specification and “equivalents thereof.” 35 U.S.C. § 112, sixth paragraph; *see also* MPEP § 2181. The Examiner “must apply 35 U.S.C. 112, sixth paragraph in appropriate cases, and give claims their broadest reasonable interpretation, **in light of and consistent with the written description of the invention in the application.**” MPEP 2181, sub-section I, pg. 2100-220, 8th ed., rev. 2 (emphasis added).

Applicants respectfully submit that it is permissible and acceptable to express structural limitations in functional terms. The function of inducing fluid flow is described in Specification paragraphs 28 and 29, among other places in the Specification. In particular, Specification paragraph 31 specifically identifies the claimed function and identifies the corresponding structure. Accordingly, because the cited prior art does not disclose equivalent structures corresponding to those disclosed in Applicants' specification and/or the limitations included in the base claim, the cited art does not teach every element of the claimed invention. Accordingly, Applicants respectfully request that the Examiner withdraw his rejection of Claim 11.

Dependent Claim 12

The Examiner rejected Claim 12 as being anticipated by the Admitted Prior Art and the Satyamurthy article. Applicants respectfully disagree. Notwithstanding that Claim 12 is allowable for depending from an allowable base claim, Applicants respectfully submit that Claim 10 is not anticipated.

Figure 1 of the Satyamurthy article shows that the upper edge of the target chamber, as viewed from the front end, has a straight, horizontal surface. The Satyamurthy article does not disclose any other specific features of the upper wall of the target chamber. Accordingly, Applicants respectfully submit that Satyamurthy does not disclose an upper wall with an arcuate surface as asserted by the examiner.

Applicants respectfully submit that Claim 12 is not anticipated by the prior art. Accordingly, Applicants respectfully request the Examiner withdraw the rejection to Claim 12.

Independent Claim 13

The Examiner rejected Claim 13 as being anticipated by Erdman, the Admitted Prior Art, and the Satyamurthy article. Applicants have amended Claim 13 to add several limitations. No new matter has been added through these limitations. The target body element has been further defined to provide an antecedent basis to support other limitations.

To more clearly define the spatial relationship of the elements, Applicants have replaced the phrase "a selected distance from" with the phrase "running alongside a portion of." Applicants respectfully submit that the two phrases are equivalent and the scope of the claim is not changed by such substitution.

The first cooling channel element includes the limitation that the channel is "running alongside a portion of said upper wall," which clearly distinguishes the invention from Satymurthy, which does not disclose a cooling channel running alongside the upper wall. Further, this claim limitation distinguishes the invention from the device disclosed in Erdman, which does not disclose a cooling channel running alongside an upper wall of the target chamber. The cooling channel **74** of Erdman runs along the back wall **64**, which does not correspond to the upper wall in the claim. The first cooling channel element also includes a limitation for the "first cooling channel having a length enclosed by said target body." This limitation requires that the first cooling channel be an internal channel, not an external channel as disclosed in the Admitted Prior Art.

The second cooling channel element has additional limitations similar to those added for the first cooling channel. Applicants note that neither Erdman, the Admitted Prior Art, nor the Satyamurthy article disclose two cooling channels each running alongside two different walls of the target chamber.

Claim 13 has been amended to state that "said first cooling channel isolated from said volume within said target chamber." Considering the claim as a whole, the only reasonable interpretation of the term isolated is isolation of the volume of the cooling channel and the target chamber. Although Applicants believe such amendment to be not required because, reading the claim as a whole, one skilled in

the art is informed of the meaning of that limitation, Applicants have amended the claim to make explicit what was implied in the claim

Applicants respectfully submit that the amendment to Claim 13 distinguishes the claimed invention from the prior art and corrects any technical deficiencies in the claim language. Accordingly, Applicants respectfully request the Examiner withdraw the rejection to Claim 13.

Dependent Claims 14 to 28

The Examiner rejected Claims 14 to 28 as being either anticipated by or obvious in view of at least one of Erdman, the Admitted Prior Art, and the Satyamurthy article. Applicants respectfully disagree. Claim 15 has been cancelled, without prejudice. Claim 21 has been cancelled as being identical to Claim 16.

Initially, Applicants note that Claims 14, 16-20, and 22-28 are allowable for depending from an allowable base claim.

With respect to the Examiner's rejection of Claim 16, Applicants respectfully refer to the section above in response to Examiner's rejection of Claim 6.

With respect to the Examiner's rejection of Claim 20, Applicants respectfully submit that Claim 20 includes structural limitations defined by characteristics of the target chamber. Applicants respectfully submit that the cited art does not teach nor disclose such characteristics with respect to the target chamber.

With respect to the Examiner's rejection of Claims 22-27, Applicants respectfully submit that Claims 22-27 are not apparatus claims that include method steps or statements of operation. One skilled in the art will recognize that a conduit's size and configuration can be defined by the type of flow (developed, turbulent, etc.) through that conduit. *See Decl.*, para. 22. Also, one skilled in the art will recognize that, without considering the conduit's size and configuration, just changing the operating parameters for a device will not always result in the claimed flow characteristics. Because the limitations expressed in terms of type of flow define structural characteristics of the claimed elements, Applicants respectfully submit that these claims are patentably distinguished from the prior art.

Independent Claim 29

The Examiner rejected Claim 29 as being anticipated by the Satyamurthy article, and for being obvious over Erdman in view of Satyamurthy and being obvious over the Admitted Prior Art in view of Satyamurthy. Applicants respectfully disagree. In rejecting Claim 29 as being anticipated by Satyamurthy, the Examiner states:

SATYAMURTHY ET AL. discloses claim 29 in the rejection of corresponding parts of claims 1, 2, 6 and 9 above wherein it is understood that SATYAMURTHY ET AL. is inherently sized appropriately to permit coolant flow and clearly capable of allowing varying coolant flow rates through the cooling channels to obtain the desired flow. The previous notes on method limitations in the preceding claims fully apply here as there.

Paper Number 20050411, Application Serial No. 10/671,086, at 26. In rejecting Claim 29 as being obvious over Erdman in view of Satyamurthy, the Examiner states:

Erdman discloses claim 29 in the rejection of corresponding parts of claims 1, 2, and 9 in section 19 and 6 above wherein it is understood that Erdman is sized appropriately and clearly capable of simply varying the coolant flow rate through the cooling channels to obtain the desired flow and the previous notes of method limitations in the preceding claims fully apply here as there.

Paper Number 20050411, Application Serial No. 10/671,086, at 28. In rejecting Claim 29 as being obvious over the Admitted Prior Art in view of Satyamurthy, the Examiner states:

APA discloses claim 29 in the rejection of corresponding parts of claims 1, 2, and 9 in section 20 and 6 above wherein it is understood that APA is sized to permit coolant flow and clearly capable of allowing varying coolant flow rates through the cooling channels to obtain the desired flow and the previous notes of method limitations in the preceding claims fully apply here as there.

Paper Number 20050411, Application Serial No. 10/671,086, at 29-30.

In each of the three grounds for rejection, the Examiner makes the same assertion that the prior art device has cooling channels "sized appropriately to permit coolant flow." Applicants admit that that is a statement of the obvious. However, in rejecting a claim, the Examiner is required to consider the complete limitation. Claim 29 includes the limitations that "said first cooling channel sized such that said first cooling channel sustains a developed flow" and that "said second cooling channel sized

such that said second cooling channel sustains a developed flow." The plain language of the claim limitations requires sizing the channels for more than a "coolant flow."

Filed herewith is a 37 C.F.R. § 1.132 Declaration of Charles W. Alvord, a person of skill in the art of target assemblies. The facts set forth in the Declaration establish that the Examiner's statement with respect to Claim 29 is incorrect. The Declaration states that "one skilled in the art has the ability to size a conduit in order to achieve a specific type of flow within that conduit." Decl. para. 22.

The Examiner also makes reference to method limitations in his grounds of rejection; however, the Examiner does not provide further specific explanation regarding how the claims are deficient. Applicants respectfully request the Examiner to be specific as to the grounds of rejection in order to aid Applicants in addressing the Examiner's concerns.

Claim 29 has been amended to replace the phrase "spaced a selected distance from" with the phrase "running alongside a portion of" with respect to the first and second cooling channels. As stated previously, Applicants believe the two phrases to be equivalent and that the scope of the claim is not changed by such amendment. Applicants respectfully submit that the plain language of the claim limitations describes structural elements not found in the cited art. In particular, Satyamurthy does not disclose two cooling channels, each running alongside one of two walls of the target chamber. Neither does Erdman nor the Admitted Prior Art disclose such structure.

Applicants note that the Admitted Prior Art discloses a cooling channel **204** formed in the back side **212** of the target assembly **110**. However, this cooling channel **204** is not running alongside the back wall of the target chamber **104** because, first, a significant portion of the target body material is intervening between the target chamber **104** and the cooling channel **204**, and, second, the rear cooling channel **204** forms an oblique angle with the back wall of the target chamber **104**.

Dependent Claim 30

The Examiner rejected Claim 30 for being obvious over Erdman in view of Satyamurthy and being obvious over the Admitted Prior Art in view of Satyamurthy.

Applicants respectfully disagree. Notwithstanding that Claim 30 is allowable for depending from an allowable base claim, Applicants respectfully submit that Claim 30 is allowable in its own right.

With respect to rejecting Claim 30 as being obvious over the Erdman in view of Satyamurthy, the Examiner states:

Erdman discloses claim 30 in the rejection of corresponding parts of claims 1, 5, and 9 in section 19 and claim 6 above.

Paper Number 20050411, Application Serial No. 10/671,086, at 28. In rejecting Claim 29 as being obvious over the Admitted Prior Art in view of Satyamurthy, the Examiner states:

APA discloses claim 30 in the rejection of corresponding parts of claims 1, 5, and 9 in section 20 and 6 above.

Paper Number 20050411, Application Serial No. 10/671,086, at 30.

The Examiner fails to address the specific limitations of Claim 30 in both of the grounds of rejection. In particular, Claim 30 includes limitations for "a third cooling channel substantially parallel to said first cooling channel" and "a fourth cooling channel substantially parallel to said second cooling channel." Referring to base Claim 29, the first and second cooling channels are associated with an upper wall and a back wall, respectively. A close examination of the Erdman patent fails to reveal any disclosure of two walls of the target chamber **60** having associated cooling channels. Likewise, a close examination of Satyamurthy and the Admitted Prior Art fails to reveal any disclosure of two walls of the target chamber having associated cooling channels as required by the claim.

Because the prior art does not disclose every element and limitation claimed, Claim 30 is not obvious over Erdman in view of Satyamurthy and Claim 30 is not obvious over the Admitted Prior Art in view of Satyamurthy. Accordingly, Applicants respectfully request the Examiner withdraw the rejection of Claim 30.

Dependent Claim 31

The Examiner rejected Claim 31 as being anticipated by the Satyamurthy article and for being obvious over the Admitted Prior Art in view of Satyamurthy. Applicants respectfully disagree. Notwithstanding that Claim 31 is allowable for depending from an allowable base claim, Applicants respectfully submit that Claim 31 is allowable in its own right.

Figure 1 of the Satyamurthy article shows that the upper edge of the target chamber, as viewed from the front end, has a straight, horizontal surface. The Satyamurthy article does not disclose any other specific features of the upper wall of the target chamber. Accordingly, Applicants respectfully submit that Satyamurthy does not disclose an upper wall with an arcuate surface as asserted by the Examiner.

Applicants respectfully submit that Claim 31 is not anticipated by Satyamurthy because Satyamurthy does not disclose an arcuate surface as claimed. Applicants respectfully submit that Claim 31 is not obvious over the Admitted Prior Art in view of Satyamurthy for the reasons stated above with respect to the base claim. Accordingly, Applicants respectfully request the Examiner withdraw the rejection to Claim 31.

Independent Claim 32

The Examiner rejected Claim 32 as being anticipated by Erdman, the Admitted Prior Art, and the Satyamurthy article. Applicants respectfully disagree.

Claim 32 includes means-plus-function limitations, as defined by 35 U.S.C. § 112, sixth paragraph. A means-plus-function limitation must be interpreted to cover the corresponding structure, materials, or acts in the specification and "equivalents thereof." 35 U.S.C. § 112, sixth paragraph; *see also* MPEP § 2181. The Examiner "must apply 35 U.S.C. 112, sixth paragraph in appropriate cases, and give claims their broadest reasonable interpretation, **in light of and consistent with the written description of the invention in the application.**" MPEP 2181, sub-section I, pg. 2100-220, 8th ed., rev. 2 (emphasis added).

In accordance with MPEP § 2181, it no longer is acceptable practice for the Examiner to interpret means-plus-function limitations "as reading on any prior art means or step which performed the function specified in the claim without regard for

whether the prior art means or step was equivalent to the corresponding structure, material or acts described in the specification." MPEP § 2181, pg. 2100-220 (emphasis added). The current practice is that "the application of a prior art reference to a means or step plus function limitation requires that the prior art element perform the identical function specified in the claim." MPEP § 2182, pg. 2100-227. "However, if a prior art reference teaches identity of function to that specified in a claim, then under *Donaldson* **an examiner carries the initial burden of proof for showing that the prior art structure or step is the same as or equivalent to the structure, material, or acts described in the specification** which has been identified as corresponding to the claimed means or step plus function." *Id.* (emphasis added). The MPEP further states "The 'means or step plus function' limitation should be interpreted in a manner consistent with the specification disclosure." *Id.*

For making a *prima facie* case of equivalence for a means-plus-function limitation, the MPEP states

If the examiner finds that a prior art element

- (A) performs the function specified in the claim,
- (B) is not excluded by any explicit definition provided in the specification for an equivalent, and
- (C) is an equivalent of the means-(or step-) plus-function limitation,

the examiner should provide an explanation and rationale in the Office action as to why the prior art element is an equivalent.

MPEP § 2183, pg. 2100-228. With respect to the third element above, that the prior art element is an equivalent, the MPEP states that a factor supporting such a conclusion is "(D) the prior art element is a structural equivalent of the corresponding element disclosed in the specification." MPEP § 2183, pg. 2100-228. The MPEP further requires that "the prior art element performs the function specified in the claim in substantially the same manner as the function is performed by the corresponding element described in the specification." MPEP § 2183, pg. 2100-228 (emphasis added).

Accordingly, it is necessary to consider the specification in determining the scope of the rejected claims.

Claim 32 includes limitations for "a means for containing a target liquid for irradiation" and "a means for cooling said apparatus." Applicants refer the Examiner to Specification paragraphs 30 and 31, which discuss the structure corresponding to each of the claimed functions. Applicants respectfully submit that Claim 32 is not anticipated by Erdman, the Admitted Prior Art, nor the Satyamurthy article because none of the cited art discloses equivalent structures corresponding to those disclosed in Applicants' specification, and, therefore, neither Erdman, the Admitted Prior Art, nor the Satyamurthy article, individually or in combination, teach every element of the claimed invention. Accordingly, Applicants respectfully request the Examiner withdraw his rejection of Claim 32.

Dependent Claims 33 and 34

The Examiner rejected Claim 32 as being anticipated by Erdman, the Admitted Prior Art, and the Satyamurthy article. Applicants respectfully disagree. Notwithstanding that the claims are allowable for depending from an allowable base claim, each of Claims 33 and 34 are allowable in their own right.

Claims 33 and 34 each further limit the means for cooling element of Claim 32 by requiring the means for cooling to include structural limitations. Claim 34 has been amended to clearly state that the limitation refers to the means for cooling element. Applicants respectfully submit that Claims 33 and 34 include limitations not disclosed in the cited prior art. In particular, the Admitted Prior Art does not disclose internal cooling channels and none of the cited art discloses an internal cooling channel capable of maintaining either a developed flow or a turbulent flow. Accordingly, Applicants respectfully request the Examiner withdraw his rejection of Claims 33 and 34.

New Claims

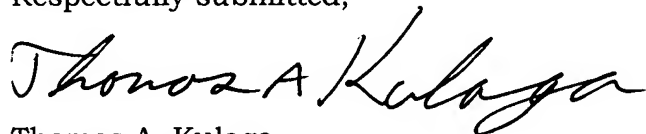
Applicants have added Claims 35 and 36. Applicants respectfully submit that no new matter has been added by such new claims.

Conclusion

In view of the amendment of Claims 1-5, 13, 29, and 34, the cancellation of Claims 15 and 21, and the addition of Claims 35 and 36, it is believed that the above-identified patent application is in a condition for the issuance of a Notice of Allowance. Such action by the Examiner is respectfully requested. If, however, the Examiner is of the opinion that any of the drawings or other portions of the application are still not allowable, it will be appreciated if the Examiner will telephone the undersigned to expedite the prosecution of the application.

Please charge any additional fees associated with this communication, or credit any overpayment, to Deposit Account No. 16-1910 (29363.00).

Respectfully submitted,

A handwritten signature in black ink, reading "Thomas A. Kulaga". The signature is written in a cursive, flowing style.

Thomas A. Kulaga
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AMENDMENTS TO THE DRAWINGS

The attached sheet of drawings includes changes to FIG. 1. This sheet, which includes FIG. 1, replaces the original sheet including FIG. 1.

In FIG. 1, item number **104** pointing to the bottom cooling channel has been changed to item number **102'**.

Attachment:

Replacement Sheet containing FIG. 1.